



US Army Corps of Engineers



Underwater Munitions Areas at Formerly Used Defense Sites (FUDS)

**Shah Alam, PhD, PMP
Environmental & Munitions Center of Expertise
Shah.Alam@usace.army.mil
6 May 2009**

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 06 MAY 2009		2. REPORT TYPE		3. DATES COVERED 00-00-2009 to 00-00-2009	
4. TITLE AND SUBTITLE Underwater Munitions Areas at Formerly Used Defense Sites (FUDS)				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) US Army Corps of Engineers,Environmental & Munitions Center of Expertise,Huntsville,AL,35807				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES Presented at the NDIA Environment, Energy Security & Sustainability (E2S2) Symposium & Exhibition held 4-7 May 2009 in Denver, CO.					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 14	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			



FUDS Underwater Areas

- Associated with water ranges
- Inland water bodies (lakes, ponds, rivers)
- Coastal areas (lagoons, near shore)
- NO Offshore-Disposal Sites



Underwater Data are Approximate

- Few studies focused on characterizing underwater areas:
 - Natural barrier to exposure - relatively inaccessible - lower risk
 - Expensive to study and clean-up
 - Limited application of available technologies for detection, evaluation, recovery, and disposal



FUDS Underwater Data Compilation Study

- Compilation of readily available information
- Data elements for each underwater area Include
 - Identifying information
 - Area (Acreage)
 - Operations history
 - Munitions involved
 - Historical, current and anticipated future use
 - Munitions Response Site Priority or Alternative Rating
- 317 FUDS/435 Ranges include underwater area



US Army Corps of Engineers



FUDS Underwater Area Example: Inland

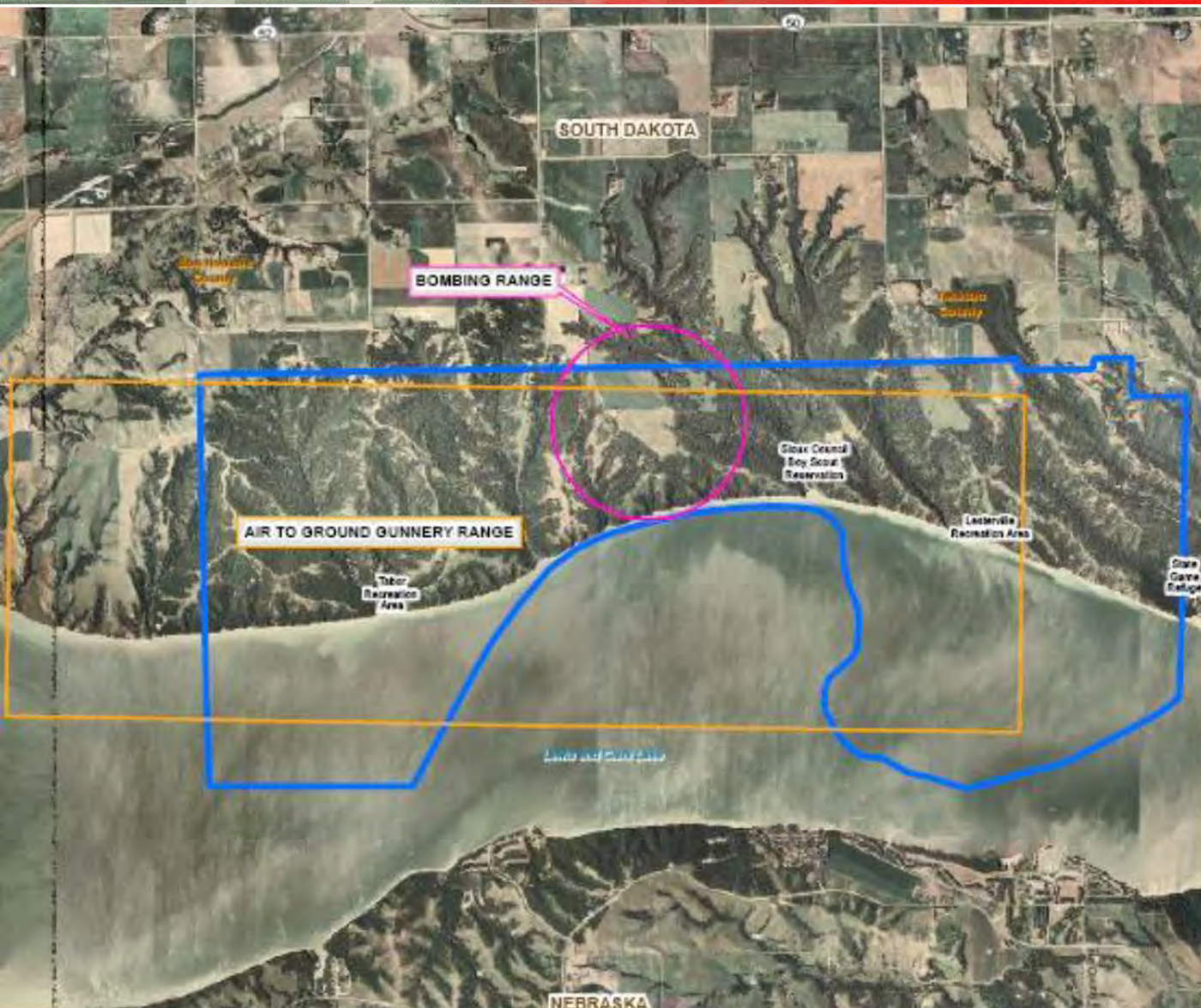
Yankton Air to Ground Gunnery Range

Bon Homme and Yankton Counties, SD

FUDS Property No. B08SD0876



US Army Corps of Engineers



Legend

- Yankton Air to Ground Gunnery Range FUDS Boundary
- Bombing Range Boundary
- Air To Ground Gunnery Range Boundary

NOTES

- 1) FUDS and range boundaries were derived from the Yankton ATG Gunnery Range ASR Supplement.
- 2) Aerial photo (Bon Homme and Yankton Counties) obtained from the U.S. Department of Agriculture, Service Center Agencies, photo is from the USDA-APFO National Agriculture Inventory Project (NAIP), 2006.



0 1,750 3,500 7,000 Feet
REFERENCE PROJECTION: NAD 83 UTM Zone 14N



U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER

FIGURE 2-2

CURRENT SITE LAYOUT

YANKTON AIR TO GROUND GUNNERY RANGE



US Army Corps of Engineers



Legend

- Yankton Air to Ground Gunnery Range FUDS Boundary
- Bombing Range Boundary
- Air To Ground Gunnery Range Boundary

NOTES:

- 1) FUDS and range boundaries were derived from the Yankton ATG Gunnery Range ASR Supplement.
- 2) Historical aerial photographs were obtained from the National Archives, they are dated August 10, 1941.



0 1,750 3,500 7,000
Feet

REFERENCE PROJECTION: NAD 83 UTM Zone 14N



U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER

FIGURE 2-1B
ORIGINAL SITE LAYOUT
HISTORICAL AERIAL PHOTOGRAPHS
YANKTON AIR TO GROUND GUNNERY RANGE



Yankton Air to Ground Gunnery Range

Historical Use	Total Acre	Land Acre	Tidal Water Acre	Inland Water Acre
Bombing (44-46)	649	642	0	7
Air-to-Ground (44-46)	7680	4184	0	3496



US Army Corps of Engineers



FUDS Underwater Area Example: Inland & Near Shore

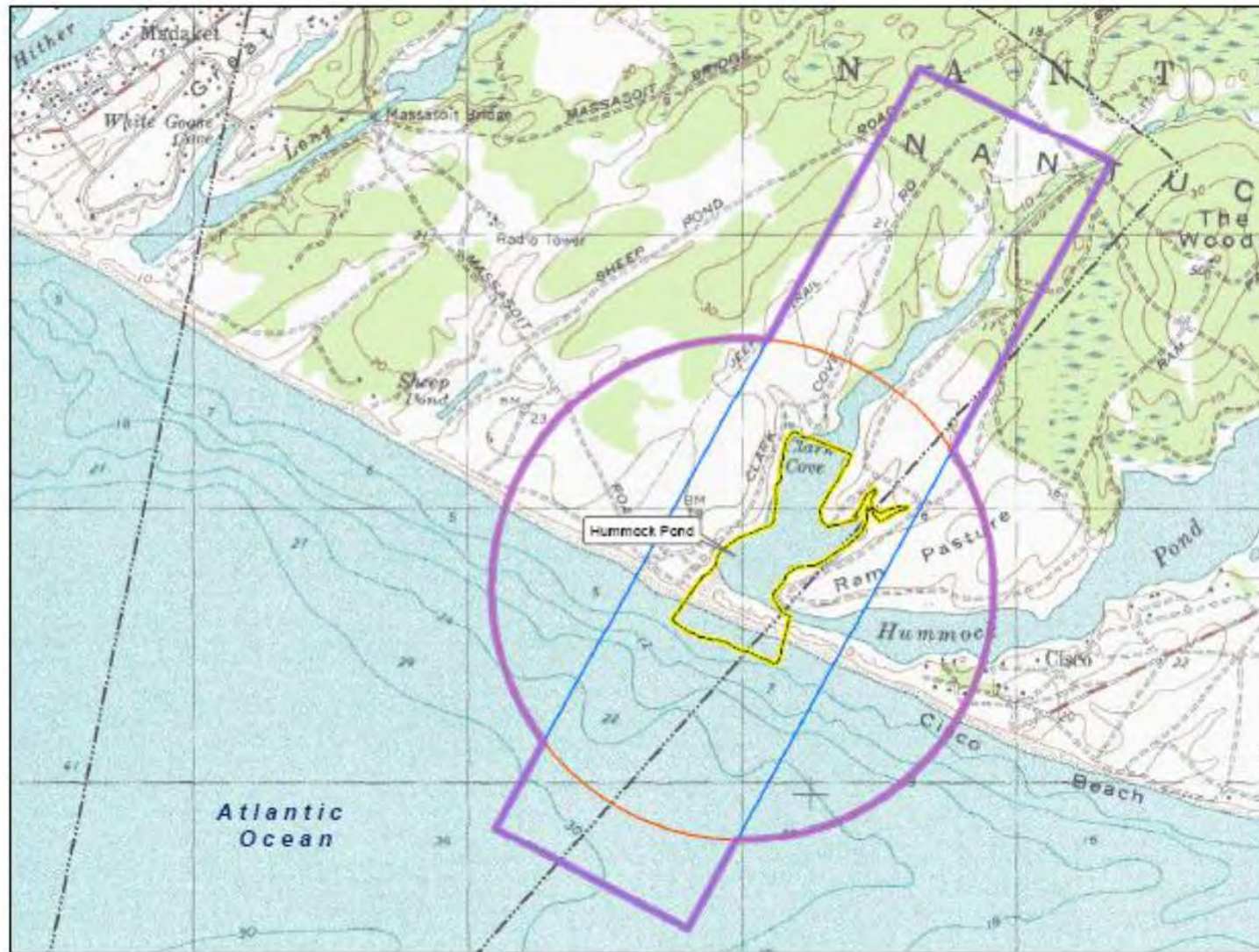
Hummock Pond

Nantucket Island, MA

FUDS Property No. D01MA0454



US Army Corps of Engineers



Hummock Pond Nantucket Island, Massachusetts

Legend

- MRS 1 - Aerial Target Range
 - Total Acreage = 937.73 Ac
 - Land Acreage = 575.38 Ac
 - Inland Water Acreage = 73.93 Ac
 - Tidal Acreage = 288.42 Ac
- Air to Ground Rocket Range
 - Identified on FUDS Property Number D01MA0455 (Sheep Pond)
- Bombing Range/Subset of MRS 1
- Air to Ground Gunnery Range/
Subset of MRS 1
- FUDS Boundary

Sources:
USACE, 2004
USDA-NRCS-NOCC, 2000
USGS Topographic Quadrangle, 1978



0 250 500 1,000
Meters





US Army Corps of Engineers



Hummock Pond
Nantucket Island, Massachusetts

Legend

- Sheep Pond
- MRS 1 - Aerial Target Range
- FUDS Boundary

Sources:
- USGS, 1971
- Office of Geographic and Environmental Information
(MassGIS) Commonwealth of Massachusetts
Executive Office of Environmental Affairs, 2007





Hummock Pond

Historical Use	Total Acre	Land Acre	Tidal Water Acre	Inland Water Acre
Bombing (43-46); Air-to- Ground (43-46)	938	575	289	74



Conclusion

- FUDS include some underwater area
- Underwater areas are associated with water ranges
- Underwater areas pose relatively lower risks compared to land areas of FUDS



US Army Corps of Engineers



Questions?

Shah Alam

(256) 895-1349

Shah.Alam@usace.army.mil